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Use of imidazolium derived salts as NHC catalysts in aqueous solution for aldehyde oxidation

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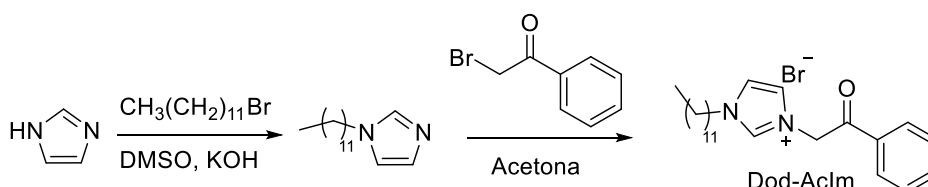
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Highlights

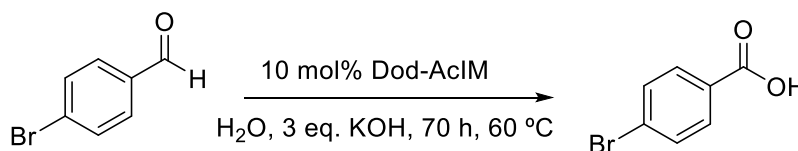
An imidazolium salt bearing a long alkyl chain was prepared. The compound is active in the oxidation of 4-bromobenzaldehyde, indicating the formation of carbene species.

Resumo/Abstract

Carbenes are important compounds that can be applied as organocatalysts or metal ligands for different reactions. An important subclass of this type of compound are the so-called *N*-heterocyclic carbenes (NHCs) derived from the imidazolium ring. Due to their high basicity, these NHCs are rarely used in water. Therefore, overcoming this challenge can contribute significantly to green chemistry. As demonstrated recently by our group, the introduction of a long alkyl chain in the nitrogen of the imidazolium group favors the formation of transient and active NHC species. In this context, here we developed Dod-Aclm (scheme below), an imidazolium salt that can generate NHC species in aqueous medium.



The catalytic activity of Dod-Aclm was evaluated in the oxidation of 4-bromobenzaldehyde to the respective carboxylic acid (see scheme below) in aqueous medium in the presence of KOH , using 10 mol% of Dod-Aclm. The yield and selectivity of the reaction were evaluated by $^1\text{H-NMR}$.



The catalyzed reaction led to a yield of approximately 70 % for 4-bromobenzoic acid. The control reaction, conducted in the absence of the catalyst, led to a mixture of 10% of carboxylic acid and 10% of 4-bromobenzyl alcohol, indicating that in the absence of the catalyst only the Cannizzaro reaction is observed. Considering the results obtained, it is noted that Dod-Aclm can generate NHC species. Additional studies are being carried out to expand the reaction scope and application.

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